

REPORTS ON CURRENT WORK

TEMPERATURES IN THE DEVON ISLAND ICE CAP, ARCTIC CANADA

By W. S. B. PATERSON

(Polar Continental Shelf Project, Department of Energy, Mines and Resources, Ottawa
K1A 0E4, Canada)

ABSTRACT. Temperatures have been measured in a 299 m bore hole that reaches the base of the ice near the divide of the main ice cap on Devon Island in the Canadian Arctic Archipelago. Temperature ranges from -23.0°C at a depth of 20 m to -18.4°C at the bottom. The difference between surface and bottom temperatures is about 1.5 deg less than expected for a steady state. Recent climatic warming seems the most likely explanation of the discrepancy. The temperature gradient in the lowest 50 m is approximately linear and corresponds to a geothermal heat flux of 1.5 h.f.u. This value may be invalid, however, because temperatures at and below this depth have probably been perturbed by changes of surface temperature during the past several thousand years, particularly by the warming at the end of the last glaciation. A detailed analysis of the results is in progress.

DISCUSSION

W. F. BUDD: Do you have any measurements for control of elevation change with time (or balance) to be able to separate climatic temperature changes from changes due to the ice-cap elevation variation?

W. S. B. PATERSON: By comparing the decrease in length of the bore hole in one year with the annual mass balance (10 year average) I conclude that the ice cap, at the drill site, is thickening slightly at present. However, I do not know for how long this thickening has been taking place.

FUTURE REGARD TO THE ATOMIC WASTE DISPOSAL PROBLEM

K. PHILBERTH

(Peter-Rosegger-Strasse 6, 8031 Puchheim, West Germany)

ABSTRACT. The waste disposal in an ice sheet need not rely on storage periods longer than some hundreds of years. Three hundred years after dumping, the radioactive power of the fission products has decreased to about 10^{-4} times the value of two-year-old waste. Six hundred years after dumping, it has decreased to about 10^{-6} times the two-year value. There are only four radioactive fission-isotopes with half-lives between six years and 60 000 years: ^{85}Kr (10 years) has practically disintegrated after 300 years. ^{90}Sr (with its daughter ^{90}Y) and ^{137}Cs (both 30 years) are reduced to 10^{-3} after 300 years and to 10^{-6} after 600 years. ^{151}Sm (85 years) has an extremely low disintegration energy; the waste contains only a very small percentage of this isotope.